

Evidence 5

申請日期	
案 號	
類 別	

292540

(以上各欄由本局填註)

發明 專利 說明 書 新型		
一、發明 創作 名稱	中 文	脊椎輔助固定裝置
	英 文	
二、發明人 創作	姓 名	林智一
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脊椎輔助固定裝置

四、中文創作摘要（創作之名稱：

一種脊椎輔助固定裝置，其包括：

一輔助固定片，其一端為結合元件，用以和脊椎固定裝置結合，另一端為螺孔片，該螺孔片有一螺孔；及

一雙螺牙自身鎖定螺釘，其由底至頂依序為第一螺牙部、第二螺牙部和螺頭部，其中該第一螺牙部用以鎖入待固定脊椎骨節或其上下骨節，該第二螺牙部用以和上述螺孔片上之螺孔螺合，而該螺頭部除用以配合鎖合工具外，並兼為該雙螺牙自身鎖定螺釘之止落部。

英文創作摘要（創作之名稱：

附註：本案已向

國（地區）申請專利、申請日期：

案號：

五、創作說明()

本創作係有關一種脊椎輔助固定裝置。

傳統之脊椎輔助固定裝置，係為橫向輔助固定裝置，例如以固定索分別和在待固定脊椎骨節和其上下骨節兩側脊椎固定裝置的固定桿接合；或以扣夾裝置(見創作人另一創作，申請案號82211220)，分別鉤住在待固定脊椎骨節和其上下骨節兩側脊椎固定裝置的固定桿上。該等橫向輔助固定裝置，對兩組脊椎固定裝置上的固定桿間的固定效果確有增進，但對鎖入待固定脊椎骨節或其上下骨節的骨釘，或鉤於待固定脊椎骨節或其上下骨節上的骨鉤卻無輔助固定功能。當脊椎固定復位系統用於尾椎時，更是需要脊椎輔助固定裝置，否則固定效果不足，目前用於尾椎的脊椎輔助固定裝置。例如：使用美國第5,133,717專利所揭示之尾椎固定器，該固定器本身即有數個輔助孔，用以打入輔助骨釘，但該等輔助固定裝置，係直接附於該尾椎固定器上，無法依手術時的實際需要，選擇適當的輔助固定裝置。

本創作之一目的，在提供一種由輔助固定片和雙螺牙自身鎖定螺釘所構成的脊椎輔助固定裝置。

圖1為本創作一較佳具體例之分解圖。

圖2為本創作另一較佳具體例之分解圖。

圖3為本創作又一較佳具體例裝置後之示意圖。

圖4為圖3所示脊椎輔助固定裝置中，輔助固定片之俯視圖。

圖5至圖7為本創作不同形式輔助固定片和脊椎固定

五、創作說明()

桿之結合示意圖。

本創作之脊椎輔助固定裝置，其包括：

一輔助固定片，其一端為結合元件，用以和脊椎固定裝置結合，另一端為螺孔片，該螺孔片有一螺孔；及

一雙螺牙自身鎖定螺釘，其由底至頂依序為第一螺牙部、第二螺牙部和螺頭部，其中該第一螺牙部用以鎖入待固定脊椎骨節或其上下骨節，該第二螺牙部用以和上述螺孔片上之螺孔螺合，而該螺頭部除用以配合鎖合工具外，並兼為該雙螺牙自身鎖定螺釘之止落部。

上述之輔助固定片，係由結合元件和具有螺孔的螺孔片所構成，結合元件和螺孔片以一體構成為較佳。

上述之結合元件，係用以和脊椎固定裝置結合，其結合方式可採用任意習知的結合方式，諸如螺合、套合、鉤合等，依需要而定。例如用於脊椎固定裝置側翼的輔助固定時，該結合元件可採用鉤狀物，以鉤合方式鉤於脊椎固定裝置的固定桿上；用於尾椎的輔助固定時，該結合元件可採用公(母)螺牙，以螺合方式螺合於脊椎固定裝置固定桿末端預設的母(公)螺牙上。

上述之螺孔片，用以設一螺孔，以便和上述雙螺牙自身鎖定螺釘的第二螺牙部螺合。該螺孔片的形狀並無特定限制，可依需要採用不同形狀，例如環狀、板狀等，一般而言，用於尾椎的脊椎輔助固定裝置，其螺孔片以採用環狀或其類似形狀為較佳，而用於脊椎固定裝置側翼的脊椎輔助固定裝置，其螺孔片以採用板狀為較佳。

五、創作說明()

上述之雙螺牙自身鎖定螺釘，其第一螺牙部和一般脊椎固定裝置所用骨釘相同或類同，其特點在該第二螺牙部具有複數條實質上等距分佈的螺牙，該等螺牙的螺距和第一螺牙部的螺距實質上相等。此處所謂複數條，以二至六條為較佳，以二至四條為更佳。

上述之雙螺牙自身鎖定螺釘，其第一螺牙部用以鎖入待固定脊椎骨節或其上下骨節，因此螺牙不可太小，否則固定效果不佳；但其第二螺牙部係用以和輔助固定片的螺孔片螺合，而該螺孔片通常不會太厚，因此螺孔片的螺孔和雙螺牙自身鎖定螺釘的第二螺牙部，其螺距都不宜太大，否則螺孔片的螺孔，其厚度可能不足一個螺距，造成固定效果不佳。若單純使雙螺牙自身鎖定螺釘的第一螺牙部具有較大螺距，而第二螺牙部具有較小螺距，則當雙螺牙自身鎖定螺釘的第一螺牙部鎖入待固定脊椎骨節或其上下骨節時，最初沒有問題，但當鎖到雙螺牙自身鎖定螺釘的第二螺牙部開始和輔助固定片的螺孔片螺合時，由於第一螺牙部和第二螺牙部螺距不同，若欲使輔助固定片轉一圈，則第一螺牙部和第二螺牙部的旋進距離(即一個螺距)不同，將使硬度較小的待固定脊椎骨節或其上下骨節被第一螺牙部磨損，以便第一螺牙部的旋進距離和第二螺牙部的旋進距離相同，如此一來，雙螺牙自身鎖定螺釘和待固定脊椎骨節或其上下骨節的結合效果極差(因此待固定脊椎骨節或其上下骨節被第一螺牙部破壞)，亦即脊椎輔助固定裝置的輔助固定效果不佳。

五、創作說明 ()

本創作之雙螺牙自身鎖定螺釘，其第二螺牙部具有複數(n)條實質上等距分佈的螺牙，因此其螺距雖然大，但其相鄰螺牙間的距離，只有原來螺距的 $\frac{n}{1}$ 分之一，當然輔助固定片的螺孔片，其螺孔相鄰螺牙間的距離也只有原來螺距的 $\frac{n}{1}$ 分之一。例如第一螺牙部的螺距為2.1毫米，n為3，則第二螺牙部和螺孔片螺孔的相鄰螺牙間距離為0.7毫米(但每條螺牙本身的螺距仍為2.1毫米)。因此螺孔片的厚度足以容納數個螺牙，因此既可滿足第一螺牙部螺距宜大，第二螺牙部相鄰螺牙距離宜小的要求，又能使第一螺牙部和第二螺牙部旋進距離相同。

上述之螺頭部可為習知骨釘之螺頭部，例如可為具有工具孔之螺頭部、成正六邊形之螺頭部等。

為進一步說明本創作之脊椎輔助固定裝置，茲以較佳具體例配合圖式說明如下。

圖1中，100為輔助固定片，110和120分別為其結合元件和螺孔片，該螺孔片120為一具有螺孔121的環狀結合元件，而結合元件110為螺絲狀螺合元件；200為雙螺牙自身鎖定螺釘，210，220和230分別為其第一螺牙部、第二螺牙部和螺頭部；300為脊椎固定裝置的固定桿，310為該固定桿一端的螺孔，用以和該結合元件110螺合。

圖2中，100，120，121，200，210，220，230和300的定義同圖1，其和圖1之差別在於結合元件110不具有螺牙，固定桿一端的結合孔310也不具有螺牙，其結合方式係採套合方式。

五、創作說明 ()

圖 3 為用於固定桿側邊的脊椎輔助固定裝置的裝置圖，圖中 100，110，120，200，210，230，300 的定義同圖 1；400 為脊椎固定裝置；500 為待固定脊椎骨節或其上下骨節。其中結合元件 110 係由雙鉤片 111 和 112 所構成，用以鉤住固定桿 300。雙螺牙自身鎖定螺釘 200 形狀類同圖 1。

圖 4 為圖 3 所示脊椎輔助固定裝置的輔助固定片 100 的俯視圖，其中 111 和 112 為結合元件 110 的兩個鉤片，120 為螺孔片，121 為其上的螺孔。

圖 5、6、7 分別為不同形式的輔助固定片 100 和脊椎固定桿 300 的結合示意圖。其中標號 100，110，120 和 300 定義同圖 1。圖 5 和圖 6 中，輔助固定片 100 係以螺孔 (圖中未示) 和脊椎固定桿螺合，而圖 7 係以單鉤片鉤在脊椎固定桿上。

292549
六、申請專利範圍

1. 一種脊椎輔助固定裝置，其包括：

一輔助固定片，其一端為結合元件，用以和脊椎固定裝置結合，另一端為螺孔片，該螺孔片有一螺孔；及

一雙螺牙自身鎖定螺釘，其由底至頂依序為第一螺牙部、第二螺牙部和螺頭部，其中該第一螺牙部用以鎖入待固定脊椎骨節或其上下骨節，該第二螺牙部用以和上述螺孔片上之螺孔螺合，而該螺頭部除用以配合鎖合工具外，並兼為該雙螺牙自身鎖定螺釘之止落部。

2. 如申請專利範圍第1項所述之脊椎輔助固定裝置，其中該輔助固定片為尾椎輔助固定用之環狀輔助固定片。

3. 如申請專利範圍第1項所述之脊椎輔助固定裝置，其中該輔助固定片為單鉤或雙鉤式側翼用輔助固定片。

4. 如申請專利範圍第1、2或3項中任一項所述之脊椎輔助固定裝置，其中該雙螺牙自身鎖定螺釘之第二螺牙部，係由複數條實質上和該第一螺牙部等螺距之螺牙所構成。

5. 如申請專利範圍第4項所述之脊椎輔助固定裝置，其中該第二螺牙部具有2至4條等距分佈之螺牙所構成。

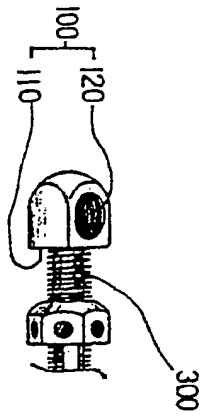


圖 5

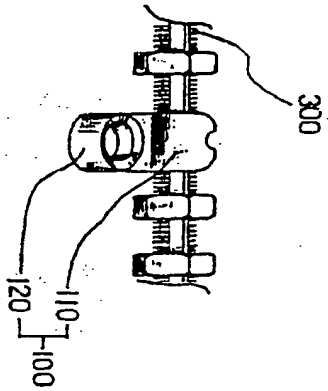


圖 7

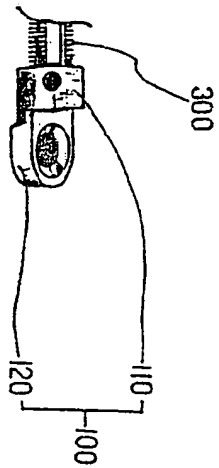


圖 6

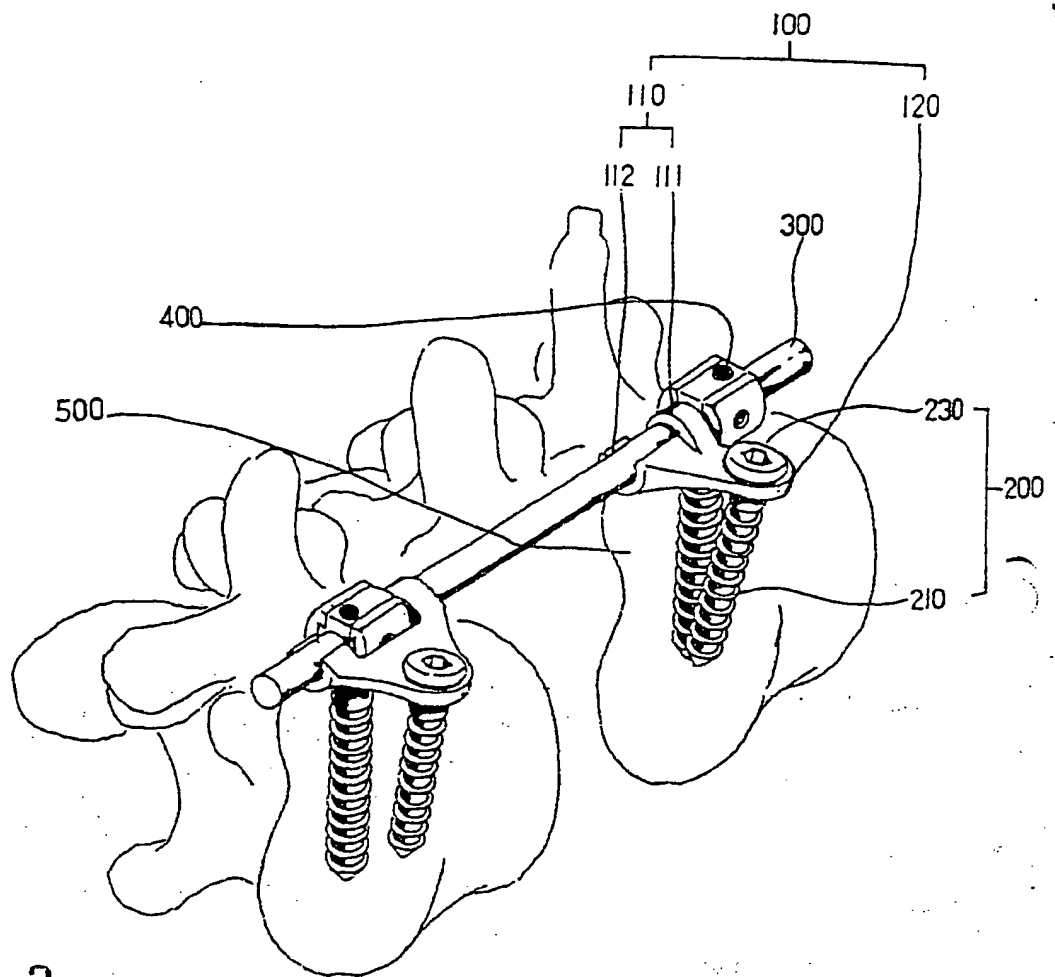


圖 3

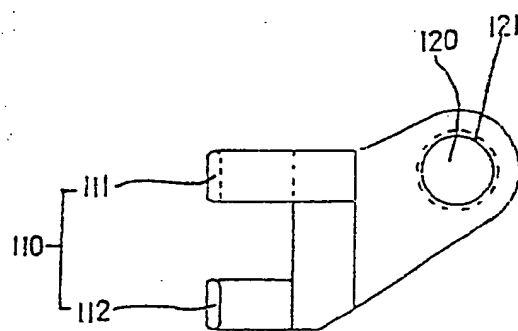


圖 4

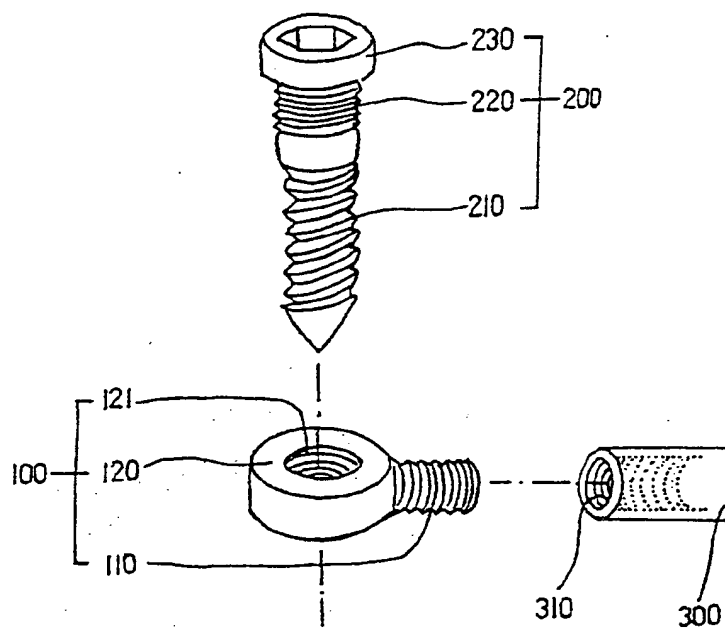


圖 1

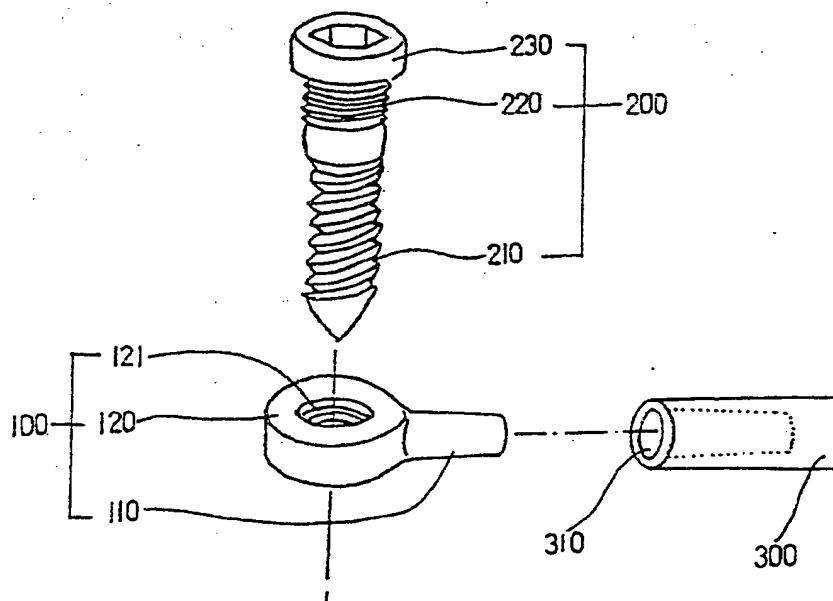


圖 2

Evidence 5

Date of application	
Case No.	
Category	

(Above various columns are filled in by the Office) **292540**

Specification for Invention or New Utility Model Patent		
I. Name of invention and creation	Chinese	脊椎輔助固定裝置
	English	Vertebra auxiliary fixing device
II. Inventor or creator	Name	Lin Chih-I
	Native place (citizenship)	The Republic of China
	Residence	34, No. 34 Lane, Dazhi Street, Taipei City
III. Applicant	Name(title)	Lin Chih-I
	Native place (citizenship)	The Republic of China
	Residence (office)	34, No. 34 Lane, Dazhi Street, Taipei City
	Name of representative	

292540

IV. Abstract of creation in Chinese (Title of creation: Vertebra Auxiliary Fixing Device)

The vertebra auxiliary fixing device of this creation consists of an auxiliary fixing module, of which one end is a fastener used for fastening the vertebra fixing device and the other end is a screw hole plate with a bolt hole, and a double-threaded self-locking screw composed of the first screw thread part, the second screw thread part and the screw head part in sequence from bottom to top. The first screw thread part of the self-locking screw is used for locking in the vertebra joint to be fixed or the joints above and below the vertebra joint, the second screw thread part is used for screw fastening with the screw hole of the above screw hole plate and the screw head part, in addition to working with the lock fastening tools, stops the self-locking screw from falling out.

Abstract of creation in English (Title of creation:)

Note: This case has made application with Country (Region) for patent. Date of application: Case No.

V. Description of the creation ()

This creation is related to a vertebra auxiliary fixing device.

The traditional vertebra auxiliary fixing device is a lateral auxiliary fixing device, for example, the tying of the fixing rope around the fixing bars at the vertebra joint to be fixed and the vertebra fixing device on both sides of the joints above and below the vertebra joint separately or the fastening and clamping device (see another creation of the creator, application case No.82211220) used to hook the vertebra joint to be fixed and the fixing bars of vertebra fixing device on both sides of the joints above and below the vertebra joint. Both of these lateral auxiliary fixing devices have improved the fastening between the fixing bars on the two groups of vertebra fixing devices but have no auxiliary fixing effect on the bone nails for locking in the vertebra joint to be fixed or the joints above and below the vertebra joint or the bone hook for hooking the vertebra joint to be fixed or the joints above and below the vertebra joint. When the vertebra fixing and reduction system is used in caudal vertebrae, the vertebra auxiliary fixing device is needed. Otherwise, the fixation effect will be insufficient. As the vertebra auxiliary fixing devices used for caudal vertebrae at present, such as the caudal vertebrae fixer shown by the application of American Patent No. 5,133,717, which itself has several auxiliary holes used for striking in auxiliary bone nail, are directly attached to the fixer of the caudal vertebra, it is impossible to select a suitable auxiliary fixing device in accordance with the actual need during operation.

One of the objectives of this creation is to provide a vertebra auxiliary fixing device composed of an auxiliary fixing module and a self-locking screw with two different threads.

Fig. 1 is the breakdown drawing of a good example of this creation.

Fig. 2 is the breakdown drawing of another good example of this creation.

Fig. 3 is the schematic of a better device example of this creation.

Fig. 4 is a top view of the auxiliary fixing module in the vertebra auxiliary fixing device shown in Fig. 3.

Figs. 5 to 7 are the schematics of the combinations of auxiliary fixing module in different forms and vertebra fixing bar.

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V. Description of the creation ()

The vertebra auxiliary fixing device of this creation consists of an auxiliary fixing module, of which one end is a fastener used for fastening the vertebra fixing device and the other end is a screw hole plate with a bolt hole, and a double-threaded self-locking screw composed of the first screw thread part, the second screw thread part and the screw head part in sequence from bottom to top. The first screw thread part of the self-locking screw is used for locking in the vertebra joint to be fixed or the joints above and below the vertebra joint, the second screw thread part is used for screw fastening with the screw hole of the above screw hole plate and the screw head part, in addition to working with the lock fastening tools, stops the self-locking screw from falling out.

The above auxiliary fixing module is composed of a fastener and a screw hole plate, and ideally the fastener and screw hole plate are made into an integral piece.

The above fastener is used to combine with the vertebra fixing device and their combination may adopt any conventional forms of combination, such as screw fastening, sleeve fastening or hook fastening, depending on the need. For example, when used for the auxiliary fixing on the side wings of the vertebra fixing device, the fasteners may adopt hook-shaped objects to hook the fixing bar of vertebra fixing device in the form of hook fastening. When used for auxiliary fixing of caudal vertebrae, the fasteners may adopt male (female) threads to make screw-fastening with the female (male) thread pre-set in the extreme end of vertebra fixing bar in the form of screw fastening.

The above screw hole plate is used for setting a screw hole so as to make screw-fastening with the second screw thread part of the above double-threaded self-locking screw. The shape of the screw hole plate is not subject to particular restriction and may adopt different shapes in accordance with the need, such as an annular shape, plate shape, etc. Generally speaking, when used in the vertebra auxiliary fixing device for caudal vertebrae, it is better for the screw hole plate to adopt annular or similar shapes and, when used in vertebra auxiliary fixing devices on the side wings of the vertebra fixing device, it is better for the screw hole plate to adopt a board shape.

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V. Description of the creation ()

Of the above double threaded self-locking screw, the first screw thread part uses the bone nails identical or similar with those of general vertebra fixing devices, with the characteristics that the second screw thread part has essentially equally spaced threads and the screw pitch of the equally spaced threads is essentially equal to the screw pitch of the first screw thread part. As to the number of threads, two to six are good and two to four are even better.

Of the above double threaded self-locking screw, the first screw thread part is used for locking in the vertebra joint to be fixed or the joints above and below the vertebra joint and, therefore, the screw threads should not be too small. Otherwise, the fixing results will not be good. But the second screw thread part is used for screw fastening with the screw hole plate of auxiliary fixing module and the screw hole plate usually is not too thick and, therefore, the pitch of the screw hole of the screw hole plate and the second screw thread part of the double threaded self-locking screw should preferably not be too large. Otherwise, the thickness of the screw hole of screw hole plate may be less than one screw pitch, without a satisfactory fixing result. If only the first screw thread part of the double threaded self-locking screw has a bigger screw pitch while the second screw thread part has a smaller screw pitch, it is not a problem at the beginning when the first screw thread part of the double threaded self-locking screw is locked in the vertebra joint to be fixed or the joints above and below the vertebra joint. But when it comes to the locking to the beginning of the second screw thread part of the double threaded self-locking screw and making screwed fastening with the screw hole plate of the auxiliary fixing module, due to the difference in the screw pitches of the first screw thread part and the second screw thread part, if you want to turn the auxiliary fixing module for one revolution, the screw-in distance (i.e., one screw pitch) is different between the first screw thread part and the second screw thread part, which will make the vertebra joint of less hardness to be fixed or the joints above and below the vertebra joint worn by the first screw thread part so as to make the screw-in distance of the first screw thread part identical with that of the second screw thread part. Therefore, the fastening result of the double threaded self-locking screw and the vertebra joint to be fixed or the joints above and below the vertebra joint will be very poor (by which the vertebra joint to be fixed and the joints above and below the vertebra joint will be damaged by the first screw thread part), i.e., the auxiliary fixing result of the vertebra auxiliary fixing device is not satisfactory.

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V. Description of the creation ()

Of the double threaded self-locking screw, the second screw thread part has several (n) essentially equally spaced screw starts and, therefore, though its overall pitch is large; the distance between the neighboring screw threads is only one n^{th} of original screw pitch and, of course, the distance between the screw threads of the screw hole of the screw hole plate of the auxiliary fixing module is also one n^{th} of the original screw pitch. For example, if the screw pitch of the first screw thread part is 2.1 mm and n is 3, the distance between neighboring screw threads of the second screw thread part and the screw hole of the screw hole plate is 0.7 mm (but the pitch of each screw start is still 2.1 mm). Therefore, the screw hole plate is thick enough to admit several starts and thus can both satisfy the requirement that the screw pitch of the first screw thread part is preferably big and the distance between neighboring screw threads of the second screw thread part is preferably small, and make the screw-in distance of first screw thread part identical with that of the second screw thread part.

The above screw head may be the screw head of a conventional bone nail. For example, it may be the screw head with a tool hole or one in a regular hexagon.

To further explain the vertebra auxiliary fixing device of this creation, illustrations are given using good examples and figures as follows.

In Fig. 1, 100 is an auxiliary fixing module, and 110 and 120 are its fastener and screw hole plate respectively. Screw hole plate 120 is an annular fastener with screw hole 121, and fastener 110 is a screw-like screwed fastener. 200 is a double threaded self-locking screw, and 210, 220 and 230 are its first screw thread part, second screw thread part and screw head part respectively. 300 is the fixing bar of the vertebra fixing device and 310 is the screw hole in one end of fixing bar for being used to enable screw fastening with the fastener 110.

In Fig. 2, the definitions of 100, 120, 121, 200, 210, 220, 230 and 300 are the same as in Fig. 1, with the difference from that in Fig. 1 being that fastener 110 does not have a screw thread, fastening hole 310 at one end of fixing bar also does not have a screw thread and its fastening method adopts sleeved fastening.

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V. Description of the creation ()

Fig. 3 is the installation drawing of the vertebra auxiliary fixing device on the sides of the fixing bar and, in the figure, the definitions of 100, 110, 120, 200, 210, 230 and 300 are the same as in Fig. 1. 400 is a vertebra fixing device and 500 is the vertebra joint to be fixed or the joints above and below it. Among them, fastener 110, composed of double-hook pieces 111 and 112, is used for hooking the fixing bar 300. The shape of the double threaded self-locking screw 200 is the same as in Fig. 1.

Fig. 4 is the vertical view of auxiliary fixing module 100 of the vertebra auxiliary fixing device shown in Fig. 3, where 111 and 112 are the two hooks of fastener 110. 120 is a screw hole plate and 121 is the screw hole in it.

Figs. 5, 6 and 7 are illustrations of the combinations of auxiliary fixing module 100 in different forms and vertebra fixing bar 300, where the definitions of numbers 100, 110, 120 and 300 are the same as in Fig. 1. In Figs. 5 and 6, the auxiliary fixing module 100 makes screw fastening with the fixing bar through the screw hole (not shown in figure) while in Fig. 7 the auxiliary fixing module is hooked on the vertebra fixing bar with a single hook.

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VI. Scope of patent application

1. The vertebra auxiliary fixing device of this creation consists of an auxiliary fixing module, of which one end is a fastener used for fastening the vertebra fixing device and the other end is a screw hole plate with a bolt hole, and a double-threaded self-locking screw composed of the first screw thread part, the second screw thread part and the screw head part in sequence from bottom to top. The first screw thread part of the self-locking screw is used for locking in the vertebra joint to be fixed or the joints above and below the vertebra joint, the second screw thread part is used for screw fastening with the screw hole of the above screw hole plate and the screw head part, in addition to working with the lock fastening tools, stops the self-locking screw from falling out.

2. If the vertebra auxiliary fixing device mentioned in Item 1 of Scope of Patent Application is applied for, its auxiliary fixing module is an annular auxiliary fixing module for auxiliary fixation of caudal vertebrae.

3. If the vertebra auxiliary fixing device mentioned in Item 1 of Scope of Patent Application is applied for, its auxiliary fixing module is a single-hooked or double-hooked type auxiliary fixing module used for side wings.

4. If the vertebra auxiliary fixing device mentioned in Items 1, 2 or 3 of Scope of Patent Application is applied for, the second screw thread part of its double threaded self-locking screw is composed of several screw starts of essentially equal screw pitch to that of the first screw thread part.

5. If the vertebra auxiliary fixing device mentioned in Item 4 of Scope of Patent Application is applied for, its second screw thread part is composed of 2 or 4 equally spaced screw starts.

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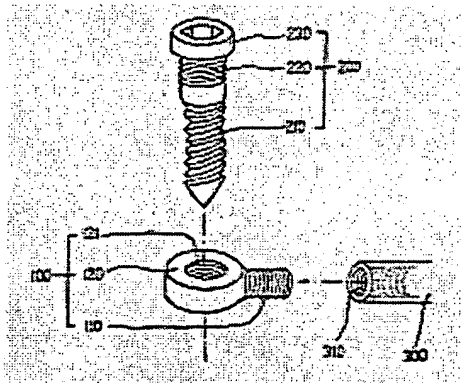


Figure 1

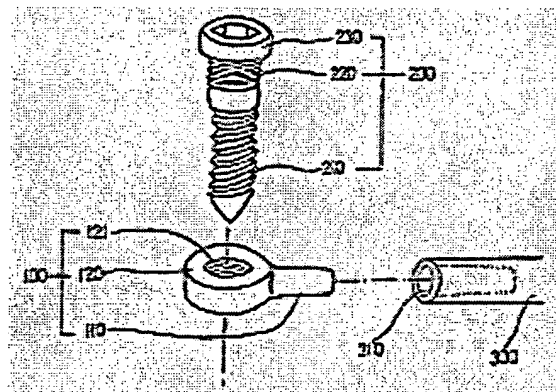


Figure 2

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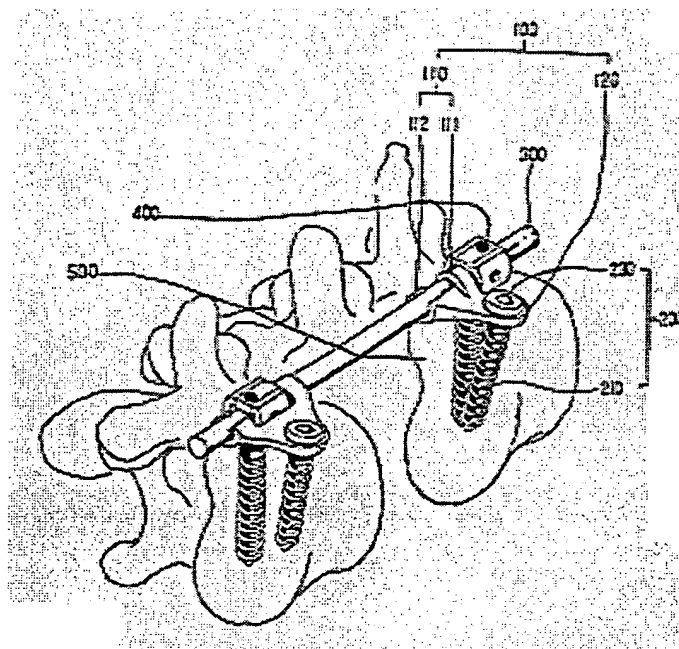


Figure 3

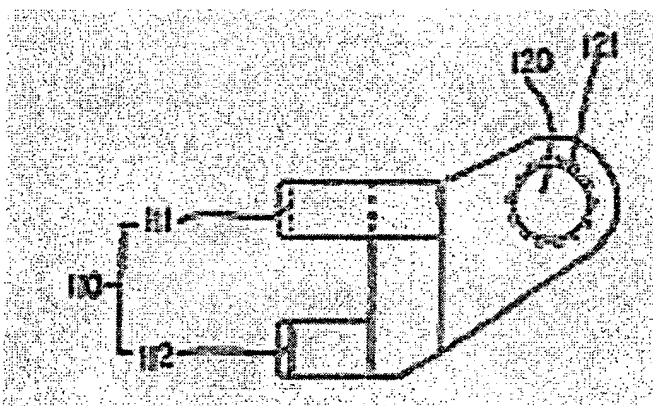


Figure 4

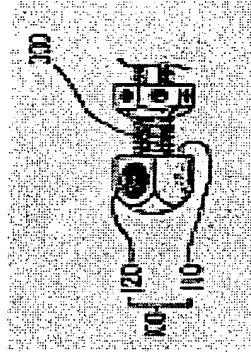


Figure 5

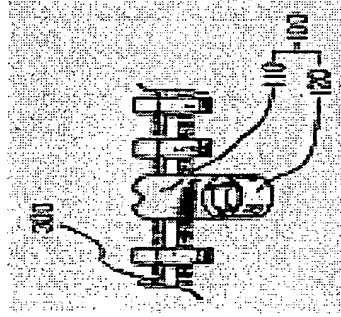


Figure 7

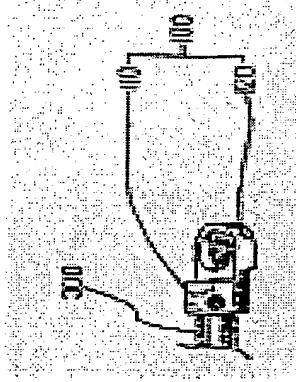
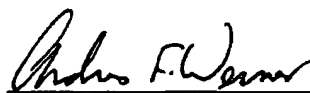


Figure 6

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Translation, DTP and Foreign Language Typesetting

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 Aug 2 2006

Andreas F. Werner Date

Director of Translations

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